Summaries of Key Related Reports

Attachment 4

1. Recommendations of the 1990 Science Review Committee.

A Scientific Review Committee visited EMTC in June 1990 when the Long Term Resource Monitoring Program for the Upper Mississippi River Basin was still being shaped. That Committee made nine recommendations designed to ensure that the program would generate front rank science as well as remaining firmly focused on its mandated objectives.

1. A general conceptual model of the FJMRB is essential to serve as a basis for project planning, problem identification, hypothesis formulation, resource allocation, and scientific synthesis at all pertinent spatial and temporal scales.

2. The LTRMP research group must recognize the importance of examining and linking different spatial and temporal scales in project design, data analysis and information synthesis. A spatio-temporal perspective that recognizes the existence of multiple scales is critical to understand and manage the riverine-floodplain system.

3. More emphasis must be placed by the project leader on achieving a holistic understanding of the UMRB by assuring that the translation of project results proceeds in a timely fashion from primary data to topical summary findings to whole project syntheses.

4. The LTRMP must place a high priority on integrating its personnel and its finding with the broader scientific community, including: 1) structuring research in the context of extant scientific literature, 2) publishing the findings in peer reviewed literature, 3) participating in national meetings of scientific societies, and 4) developing a modest program of competitive extramural support for collaborative research.

5. LTRMP leadership must develop a logical and objective rationale for prioritization of project resource allocation among competing subprojects. This rationale must be derived from the general conceptual model that guides the entire project.

6. There is a need for a coherent long-range information management plan to guide the CRIC [= CIA] program.

7. The great importance of retrospective data must be recognized, and procedures developed for systematic review in order to incorporate relevant data into the information phase of the project.

8. Staff size and expenses must be expanded to address additional research needs implied by the general conceptual model and to exploit more adequately the relevant bodies of techniques and methodologies.

9. Contingency plans must include provision for scientific study of short-term and extreme events in order to increase scientific understanding of the river system.

2. *Upper Mississippi River System Environmental Management Program Midterm Evaluation Report.*

The Executive Summary of the U.S. Army Corps of Engineers, North Central Division's August 1992 report is provided below:

The purpose of this report is to evaluate the performance of the Upper Mississippi River System Environmental Management Program (UMRS-EMP) from authorization in August 1985 through Fiscal Year 1991. The purpose of the UMRS-EMP is to ensure the coordinated development and enhancement of the Upper Mississippi River System. The program includes habitat rehabilitation and enhancement projects designed to counteract the effects of backwater and side channel sedimentation. Long Term Resource Monitoring will provide for more informed resource management and support the environmentally sustainable development of the UMRS.

The report concludes:

- ***Habitat projects are highly successful in alleviating sedimentation in the specific project areas.*** *Over 14,000 acres of the Upper Mississippi River System have directly benefited or will benefit from the completion of nine projects, ongoing construction at six other sites, and pending contract awards or construction approval at thirteen additional sites. Biological monitoring and visual observations have indicated that increases in fish and waterfowl species diversity and abundance are occurring at the completed projects.*

- ***The habitat project planning teams in the Districts have made great strides in refining and applying habitat models of representative target species to the formulation of projects.*** *By comparing habitat gains with costs, an incremental analysis for each proposed project identifies the most cost-effective plan. There is little specific guidance for the incremental analysis of habitat projects, and the EMP is advancing the state of the art/science. The HQUSACE staff has recognized the limitations of incremental analysis methods and is working with us to evolve more meaningful techniques and formats.*

- ***Administrative procedures do not allow for quick responses to habitat problems.*** *The time from project planning initiation to construction initiation has been three to five years. Administrative requirements have skewed the program in favor of large projects. Delegation of authority for small-scale habitat projects would enable relatively quick implementation of a number of potential projects that have not been formally proposed because of their smaller scale.*

- ***The Long Term Resource Monitoring Program (LTRMP) element of the EMP has become fully operational.*** *Six state-operated field stations and an Environmental Management Technical Center have been established. The large front-end investment costs have been completed.*

- ***NCD has concluded that LTRMP trend analysis data collection and research are proceeding on a scientifically sound basis.*** *During the first few years of the LTRMP, Trend Analysis monitoring proceeded without well-defined hypotheses to be tested. Subsequently, the LTRMP established a Scientific Review Committee and Technical Review Panel that has provided the basis for subsequent and ongoing program modifications. With NCD concurrence, future program reviews by the USFWS will focus on refinements to the current direction rather than making basic changes to the scientific basis of the program.*

- ***LTRMP management recognizes the need to continuously review trend analysis activities to support Corps of Engineers missions and the missions of our partner agencies.*** *The application of LTRMP products and the utilization of the EMTC resources for missions outside of the LTRMP hold great promise for the future. Examples include site selection for disposal of dredged material, natural resource management, and regulatory functions. The LTRMP water quality monitoring data and spatial data management capabilities can support Corps of Engineers missions. Recognizing the tremendous capabilities of the EMTC to provide future cost savings to other programs, efforts are underway to identify and implement specific linkages between the LTRMP and Corps missions.*

- ***The Corps of Engineers and the USFWS are in agreement that the LTRMP has a mandate to not only monitor and evaluate trends in the condition of UMRS resources, but also to conduct research to support environmentally sustainable development on the UMRS.*** *The infrastructure already exists to provide navigation study support in the form of data management, impact assessment research, and system-wide spatial information. The NCD's goal will be to leverage navigation study funds against the EMP investments already made, as well as those in the future. Over $5 million has been or is scheduled to be expended for products complementing the Upper Mississippi River-Illinois Waterway Navigation Study.*

- ***Traffic monitoring activities provided useful information for the Upper Mississippi River - Illinois Waterway Navigation study.***

- ***The Economic Impacts of Recreation Study will provide conclusive information about expenditures for recreation in the UMRS. Report to be completed by the end of 1992.***

- ***Recreation projects have not been implemented due to the low Federal priority on recreation.***

- ***Additional merits of the EMP include: (1) achievement of an effective and lasting partnership with the states of the UMRS, Region 3 of the USFWS, and others, (2) increased understanding and support of environmentally sustainable development and (3) enhanced knowledge and public appreciation of the missions of the Corps of Engineers.***

- ***The Project Management system is being implemented to ensure timely completion of habitat projects within budget.***

The following recommendations are made:

- ***That continued funding be provided to the EMP at the authorized level for the additional 5 years (beyond FY 1997) authorized by Section 1103 of WRDA 1986 and amended by Section 405 of WRDA 1990.***

- ***That the HQUSACE work with the NCD to develop appropriate frames of reference for the incremental analyses of habitat projects.***

- ***That ASA (CW) approve the delegation of authority for small-scale habitat projects.***

3. Proceedings of the Workshop for Engineering and Design of Environmental Management Program Projects, October 29-30, 1996.

The Executive Summary of that document is provided below:

> *The Rock Island District sponsored a Workshop for Engineering and Design of Environmental Management Program (EMP) Habitat Rehabilitation and Enhancement Projects (HREP) on October 29 and 30, 1996. Engineers, Planners, and Construction Representatives from St. Paul, Rock Island, and St. Louis Districts and North Central Division were in attendance. The Workshop included tours of the Spring Lake and Potters Marsh EMP projects on October 29, and presentations and facilitated group discussions on technical design features and overall management and contract administration on October 30. The primary focus of the Workshop was the exchange of ideas, techniques, and strategies to gain greater efficiency in executing the EMP program.*
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> *Project successes were discussed, such as St. Paul District's experience with island construction and Rock Island and St. Louis Districts' successes with displacement method embankment techniques, along with "less than successes," such as the flood damage to the radial gate at the Rock Island District's Lake Chautauqua project. One of the greatest challenges in project construction is site conditions, as projects are often located in remote areas of the floodplain. Suggestions for improvement in this area were to award contracts with shorter construction seasons to reduce the risk of flooding, incorporating materials such as sheet pile to cut dewatering costs, and staging construction to facilitate access to the site. Technical exchange among all three districts focused on structural details such as pump types and stoplog materials, as well as more global issues of efficiently meeting sponsor needs.*
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> *Lessons learned included the need for sound engineering investigations during design, particularly geotechnical, hydraulic, and survey data to avoid project modifications and quantity overruns. Other lessons learned included sedimentation rates greater than design estimates for dredged channels and adapting projects after construction to incorporate sponsor-requested operational changes.*
>
> *These projects are new and have more risk than traditional on-the-ground construction. This does not preclude the need for sound engineering judgment. Greater efficiency can be realized by involving engineers early in the project formulation process so as to better understand the site manager's project goals. As experience is gained through design, project operation, and performance evaluation, more innovative project features can be explored while implementing lessons learned and continuing dialogue exchange between the districts and other EMP players.*

4. *Second Science Review Committee Report on the Long Term Resource Monitoring Program - Environmental Management Technical Center.*

The Executive Summary from the December 31, 1996, report is as follows:

> *This is the report of the Science Review Committee (SRC) which visited the Environmental Technical Management Center (EMTC) on November 18-20, 1996. The Committee's*

charge is to review the scientific activities of the Long Term Resource Monitoring Program (LTRMP) in the Upper Mississippi River Basin (UMRB). This is an appropriate time for the review because the first 5-year trend analyses have just been completed. The committee found that the nine recommendations of the 1990 SRC have been conscientiously implemented with a high level of success. Noteworthy achievements that support the scientific activity include the development of the Computerized Information and Analysis system (CIA), external communications, and the level of cooperative activity that has been established. Continuing attention is needed to the advice of the 1990 Committee to analyze the UMRB system over a range of space and time scales, and to thoroughly examine historical data resources.

The present SRC has reviewed the legislative mandate and the social context of the LTRMP and concludes that the primary focus must be placed on the detection of trends in the entire UMRB system. Knowledge of these trends is needed to properly inform the policy debate and management of the system. Measurements need to be made of the fluxes of water, sediments and contaminants through the entire river system in order to understand more local ecosystem processes. The current monitoring effort is focused on local physicochemical and ecological sampling within certain pools. These local observations are important for understanding the structure and function of riverine ecosystems and to establish the magnitude and pattern of local variability.

Some changes are needed in the monitoring framework in order to expand from understanding the local level to understanding the entire system. System-wide trends will be measured over periods of a decade or more. Consideration should be given to selecting new sites for study so that eventually most or all pools and reaches in the system are observed. A rotation of intensive study sites can be set up so that pools and reaches are studied intensively for 3 to 5 years, then effort is transferred to other areas. After the lapse of a decade or more, the intensive effort returns to the original study sites to determine whether or not conditions have changed. Long term trends can also be studied by comparing current observations with historical data sets. Valuable efforts are being made within the CIA program to recover information on historical land use and river configuration. Similar efforts need to be made using historical information on water quantity, quality, and aquatic ecology.

Sampling protocols and methods for the pool studies are well established. The laboratory procedures for data quality assurance, quality control and information control are particularly effective. The staff is well aware that trend analysis of the current field data will permit optimization of further sampling effort. The SRC recommends that the EMTC senior staff place a high priority on analytical activities. The SRC remains concerned that much of the field sampling appears to be focused on obtaining only a few closely related measures at any one time. For example, limnological measurements and biotic sampling appear not to be simultaneous. Strong diurnal and synoptic variability may substantially interfere with analyses made from non-coincident data. Statistical methods also deserve close scrutiny. There appears to be a deliberate effort to organize observations to meet the requirements of advanced parametric methods with stringent control requirements. However, many environmental data cannot meet parametric completeness or distribution assumptions. Historical data almost certainly will not meet such assumptions. The SRC recommends that attention be paid to non-parametric methods within the context of a "clinical" approach to sampling and analysis.

Communications are a key aspect of any mandated program. The external technical communications of the LTRMP group appear to be at a high level, but there appear to be needs for increased internal communications to optimize scientific efforts. The role of cooperating scientists from partner agencies and from regional colleges and universities is a particular strength of this program. These people expand the number of active scientists well beyond the number of the core staff, and provide important sources of background information and communication routes to the larger public. The provision of data resources from the Center via the Internet is a pioneering achievement. The SRC reminds the Center that traditional written communications remain important for the general public and for many resource managers. The SRC is concerned that the data records of the program continue to be published on paper because rapid technological change can make electronic storage media obsolete over periods of decades.

The Committee was invited to consider the prospects for continued monitoring of the UMRB beyond the current legislative mandate. The SRC recommends that the program be continued, and that any reauthorization take into account what has been learned already. In particular, processes and activities throughout the basin influence the riverine system, and the program should be authorized to study these influences. The UMRB is a large and nationally significant system that continues to change over long periods of time. Public policy decisions about the system will be shaped both within and outside traditional agencies. The EMTC staff has established an excellent information base for current and future decision making. The LTRMP provides information on physical and ecological processes at the landscape scales and, over time, will be able to provide information for regional land management. These capabilities have been achieved by effective cooperation among several federal agencies and five state partners, so that problems which span several political and administrative units may be tackled efficiently.

Following are the 16 recommendations of the current SRC. These are repeated at the end of the report with a small number of additional contextual remarks.

Strategic recommendations: the structure of the program

1. There must be increased emphasis on studies at the systemic scale and on the upstream-downstream connections that make the river system what it is. As the first step, a box-cascade model of the river system should be articulated within the guiding conceptual model and used as the basis for implementing this approach to the system.

2. A detailed quantification of inputs to the river system must be conducted to reveal the basin and watershed influence on the river, and help to identify basin problems that need to be addressed to help to maintain and improve river conditions. An increased emphasis should be placed on viewing the UMR system as a single, integrated system, which means devoting more attention to the reach, river and basin scales. This is essential and is not inconsistent with the clear intent of the legislation, even though the legislation directs primary attention to the river itself.

3. Increased emphasis must be placed on lengthening the time horizon of observations, particularly by seeking and using historical records. This is the only way in which long-term trends will be discerned in less than one or two more decades, and we doubt that either the Congress or the public will be willing to wait so long for a first assessment of changes in the UMRB.

4. To further ensure that the research conducted at EMTC will meet the mandate of the UMRB program, adapt the conceptual model to explicitly show that the impacts of management changes in the system will be evaluated in terms of multiple sets of societal goals and values, and that the scientific information necessary to achieve these evaluations will be secured. In short, incorporate social context into the conceptual model.

Operational recommendations: data collection and analysis

5. Increased attention to hydrographic, morphometric and sedimentation data is necessary to understand the river system. These characteristics drive the system yet they are receiving comparatively little attention. Model approaches can be helpful but even they are limited to available data. The association of a geomorphologist and/or sedimentation specialist with the program may be helpful in this regard.

6. There is no distinction between monitoring and data analysis; they must both be conducted to answer questions. Hence, the analysis of data should be stressed, along with the collection of data. Within the LTRMP, there should be increased and continuous analysis of data collected and comparisons with historical conditions to guide and prioritize future sampling.

The "why" of each data collection effort must be obvious, so there needs to be a strong linkage between collections and analysis. Justifying or modifying further data collection effort in light of the results of analysis is also an opportunity to effect economies in the program.

7. It is necessary to use survey sampling and clinical statistical methods to better analyze the sampling efforts on both the spatial and temporal scales. This will help validate the approach, and help to prioritize sampling collection efforts based on input to analysis

procedures. To facilitate this work, it would be desirable to associate with the program a statistician who is very familiar with clinical and survey sampling approaches using nonparametric and multivariate methods.

8. Place increased emphasis on simultaneous collection of limnological data with fish and vegetation sampling in order to facilitate analyses that will answer critical questions. Limnological sampling should include additional cations and anions, and sediment sampling.

9. Consideration should be given to a NAWQA-type approach to long-term monitoring that will sample pools intensively for 3-5 years each on a rotational basis, with an ultimate focus on systemic conditions.

A temporally staged pattern of sampling, such as this, may be the only practical way to obtain sufficient data to distinguish system-wide and local long-term trends in the face of significant, short-term variability and the large geographical area.

10. The CIA/GIS/photointerpretation and remote sensing efforts appear excellent and should be continued, with additional attention to recovery of data of historical conditions. Other research can be facilitated by making additional use of the data resources provided by this program. This area of emphasis may require additional laboratory space in the Center.

Recommendations about communications

11. It is desirable to foster further in-house cooperation and sharing of resources and results. This will be essential to achieve the central goal of analyzing the status and trends of the river system in a holistic way.

12. It is desirable to further cooperative efforts with local, state and federal agencies. This is to share resources, to facilitate communication and to foster image. Include explicit consideration of what interest groups can best articulate the various goals that may be used to guide the Center's activities. Explicitly incorporate contacts with these groups into the science advisory process.

13. Volunteers may be appropriate for certain data collection activities and would be an effective way of involving the wider public directly in the program.

14. A book series of data reports (as USGS Open-File Reports or similar series) should be inaugurated, describing methods and error analyses as well as listing all the monitoring data, to provide assurance of continued accessibility of the data long after the program has ended. Consider the same approach to publishing research analyses.

Recommendations about the future

15. The Science Review Committee should meet in the next eighteen months to further evaluate the scientific efforts. This review should be held during the growing season to facilitate a limited amount of field evaluation of data collections and sites.

16. In re-authorizing this Program, Congress should consider expanding the scope of the effort to include scientific modeling of the relationships between human and natural activities in the entire UMR drainage basin as they affect the ecological status of the designated river reaches. Conditions in the river cannot be separated from conditions in the drainage basin that sustains it.

5. *Program Review of the Environmental Management Technical Center, U.S. Geological Survey—Biological Resources Division, February 1997.*

Recommendations

Science and Research

- The mission of the Center should appropriately extend beyond those activities required by the Act. EMTC should strive to become a more broadly based science program, building on the focus and expertise that have emerged from the capacities built through LTRMP and CIA activities. The Center should explicitly define its expanded mission. It might well focus on large river basins, especially in the mid-continent. This mission should explicitly recognize the importance of landscape, ecosystem, and watershed scale approaches that incorporate both riverine and surrounding upland habitats.

  The Center's LTRMP base should be expanded to address other science issues of importance to the Department of Interior (DOI) and other federal and state agencies. The explicit adoption of responsibility to serve DOI agencies is considered to be essential.

- Initiatives by the Center to expand its science activities using project funds from sources other than the Environmental Management Program are supported. Such projects and the resources they produce have been and should continue to be used to maintain and enhance facilities and capabilities, expand the expertise and experience of the staff, and balance erosion of buying power of the EMP base. Such projects tend to support LTRMP objectives and provide information and understanding that would not otherwise be obtained.

- There is (and should be) no distinction between monitoring and data analysis. A program such as LTRMP must involve not only scientifically sound collection of monitoring data but also research activities which include: design of monitoring systems, analysis of trends and correlations, focused research and synthesis. The Center's conducting of both monitoring and research activities, within and outside of the LTRMP context, is supported.

- In order to fulfill its research and monitoring missions, the Center Management should undertake a deliberate, proactive program to foster a more encompassing research climate at the Center.

- The planning and consultation process in use at the Center, however inclusive and useful, has become a burden that exceeds its value in producing good science of value to its partners. The BRD Science Implementation Plan provides a suitable substitute for this process. The Center should revise its procedures according to the BRD Implementation Plan.

- The next stage of monitoring should attempt to incorporate higher scale basin level questions. One important consideration is the ecological irrelevance of the definition of the Mississippi River Basin given by the Mississippi River Management Plan (limited to the navigable river channel and excluding most tributaries). While the Center must follow these limitations on LTRMP, it should

expand its scope to basin-wide considerations when the science question merits. In fact, the Center should take the initiative to become the data and science integration center for entire Upper Mississippi as envisioned in the Scientific Assessment Strategy Team (SAST) recommendations.

- The Center is especially encouraged to conduct focused studies such as those represented in the HREP program. These studies address specific hypotheses associated with management needs. Focused hypothesis testing studies should become an increasing portion of the Center's scientific activities. The current emphasis on trend analysis should continue. The Center is also urged to turn its resources to correlation and modeling studies seeking relationships among variables.

- It is essential that the Center connect more strongly with research scientist in other agencies and at Universities to participate in the data analysis. Hypotheses that are generated from these analyses should be followed by extramurally funded studies.

- The Center is urged to become more intimately connected with broader scientific enterprises. The Center will never in itself be able to hire the cadre of scientists of different disciplines and interests needed to do the evaluation of existing data sets that they deserve and to pursue all the interesting and useful research questions that emerge. The Center needs to be a part of a larger community of active scientists and managers and that it should be more engaged in an active and ongoing dialogue with a broader range of scientists, and potential partners, cooperators, and clients to ensure a balanced focus which meets both management concerns and long-term research objectives.

Administrative

- The existing Memorandum of Understanding (MOU) with the Army Corps of Engineers (COE) regarding the Long Term Resource Monitoring Program (LTRMP) at EMTC requires revision. Revision of the MOU should be preceded by discussions on assessments levied on the interagency fund transfers and on clearer and less burdensome interactions between the COE and the EMTC in the production of products, services, and scientific information through the LTRMP.

- The Center's process for monitoring all types of costs by fund, project and organizations within the Center is working well. No changes are recommended.

- Procedures relating to yearend financial closeout, obligating and payment processes, reimbursable agreements, collections, travel, imprest funds, procurement, property, and safety are working smoothly. No changes are recommendations.

Overall, EMTC employees have a sound understanding of personnel issues. Recommendations and required actions for human resources include the following:

Required Actions
-- Managers should ensure that all performance appraisals are completed and performance standards for 1997 are developed for all EMTC employees.

Recommendations
-- The Center Director should ensure that all EMTC employees receive training on the DOI Awards and Recognition Program. Staff from BRD headquarters can provide training assistance, as needed.

-- (1) Develop a mission statement that accurately reflects the new role of EMTC and (2) resume holding monthly staff meetings for all EMTC employees for the purpose of sharing information and to provide status reports on individual projects, as appropriate.

6. ***Management Review Committee Report on the Long Term Resource Monitoring Program - Environmental Management Technical Center.***

The Executive Summary and Recommendations of the report, dated March 11, 1997, are presented below:

Executive Summary

The Management Review Committee (MRC) wishes to commend the Environmental Management Technical Center (EMTC) for seeking guidance on the Long Term Resource Monitoring Program (LTRMP), as well as to express appreciation for the opportunity to review this important program. The MRC acknowledges the initiative of the Center Director in seeking management and science reviews.

The MRC strongly believes that the LTRMP provides many benefits to the region and should be continued. As the Science Review Committee (SRC) report highlighted, the Program conducts high quality scientific monitoring and research on the river and is meeting its original congressional mandates.

Some specific accomplishments include: recruiting and focusing scientific expertise on the Upper Mississippi River (UMR) system, developing an analytical laboratory, providing an international conference and regional workshops. In addition, the EMTC has greatly increased the level of technological expertise in the region, including spatial data base development and analysis, remote sensing, and photo interpretation.

The MRC's primary focus was to look at ways the Program can or should be adjusted to better meet the needs and expectations of partner agencies and the river community. In this spirit, the MRC collectively identified 14 recommendations that should assist the EMTC in its efforts to build upon the Program's past successes.

Recommendations

1. The LTRMP should continue beyond FY 2002 with a permanent authorization and annual appropriations that are cost indexed. The CIA should be an integral part of the LTRMP and not separately distinguished from the overall program.

2. The SRC recommendations should be pursued. They provide a sound scientific basis upon which to shape the future of the Program. The MRC believes that the SRC recommendations must be reviewed and approved by LTRMP partners prior to implementation.

3. The USGS (BRD) should implement, with strong emphasis on input from EMTC employees and the river community, a strategic planning process that yields a clear statement of the vision for the EMTC and how the LTRMP will be conducted consistent with that vision. This recommendation should be implemented with the development of a vision statement by April 15, 1997, and a strategic plan report by September 30, 1997.

4. In the view of the MRC, the Program priorities should focus on monitoring and analysis. Investment in technology should be appropriate to accomplish these efforts.

5. Consistent with USGS processes, the EMTC should continue to negotiate an LTRMP work plan with the Analysis Team (A-Team) that will identify specific products, costs, and a completion date for each product. Products not provided should be explained to the A-Team using the Center's existing cost accounting system.

6. The EMP-CC and A-Team should strengthen and reaffirm their roles in ensuring LTRMP performance. The Program partners should revisit the roles, responsibilities, and relationships of the EMP-CC and A-Team to ensure that they are appropriate and well understood.

7. The MRC recommends the EMTC use the opportunities afforded by the requirements of the National Performance Review to ensure effective team-based participatory management of the Center.

8. To the extent that there is cost savings achieved in LTRMP tasks, that savings should be applied to advancing other LTRMP work activities and the redirection of funds should be coordinated with Program partners.

9. A technical career path should be implemented for scientific staff who do not wish to pursue a management career path.

10. Provide a simplified (non-technical) health of the river report on an annual basis to partners and customers.

11. Annual component reports should be produced and distributed within three months of the end of the data collection year.

12. Develop and implement a plan in coordination with Program partners that improves their technical expertise and ability to use hardware/software capabilities to maximize use of LTRMP products.

13. Increase the use of information-sharing bulletins to expedite Program findings to managers, policy makers, and others.

14. The MRC, as currently constituted, should be reconvened in 18 months to review the implementation of the recommendations.